

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
17 February 2005 (17.02.2005)

PCT

(10) International Publication Number  
**WO 2005/015697 A2**

(51) International Patent Classification<sup>7</sup>: **H01S**

(21) International Application Number:  
**PCT/US2004/024737**

(22) International Filing Date: **29 July 2004 (29.07.2004)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:  
**60/492,669 5 August 2003 (05.08.2003) US**

(71) Applicant (for all designated States except US): **RUTGERS, THE STATE UNIVERSITY [US/US];** Old Queens, Somerst Street, New Brunswick, NJ 08903 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SALVERMOSER,**

**Manfred [DE/US];** 358 Parker Street, Newark, NJ 07104 (US). **MURNICK, Daniel, E. [US/US];** 201 Jockey Hollow Road, Bernardsville, NJ 07924 (US).

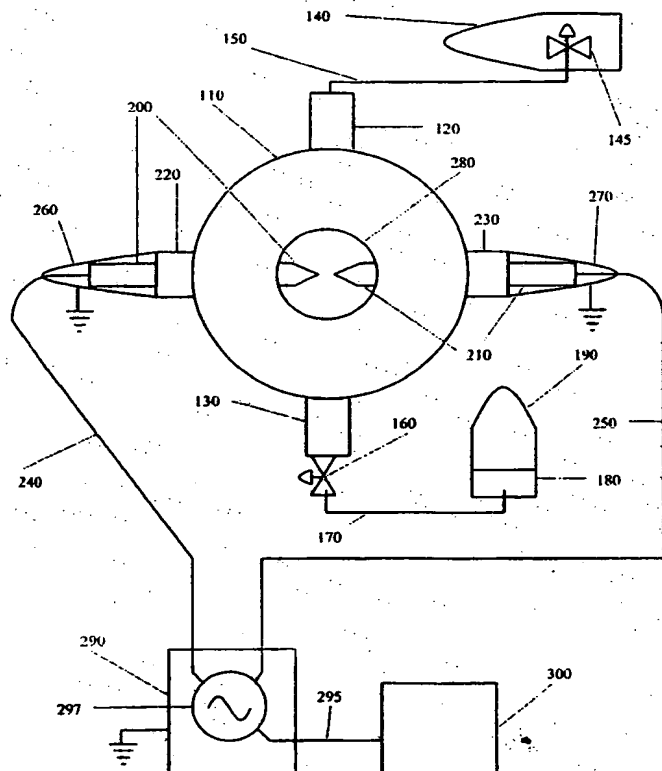
(74) Agents: **MILLET, Marcus, J. et al.;** Lerner, David, Littenberg, Krumholz & Mentlik, LLP, 600 South Avenue West, Westfield, NJ 07090 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SI, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): **ARIPO (BW, GH,**

*[Continued on next page]*

(54) Title: **HIGH FREQUENCY DRIVEN HIGH PRESSURE MICRO DISCHARGE**



(57) Abstract: A method and apparatus are provided for generating light such as ultraviolet light from excimer-forming gases. Gases are excited by radio frequency alternating current powered electrodes (200, 210) to form excimers that will decay and emit vacuum ultraviolet light. The halogen concentration is optimized so as to optimize emissions from halogen excimers ( $Z_2^*$ ) or mixed rare gas/halogen excimers ( $RGZ^*$ ). Emissions from rare gas excimers ( $RG_2^*$ ) are maximized by maintaining the gas in the discharge region at a relatively low temperature, desirably below 700 °K, so that the average kinetic energy of gas particles is less than the vibrational excitation energy of the excimer and substantially less than the dissociation energy of the excimer. Relatively large electrodes (202, 204) can be used to cool the plasma.



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *without international search report and to be republished upon receipt of that report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*